



**6712-01**

**FEDERAL COMMUNICATIONS COMMISSION**

**[ET Docket No. 15-105; DA 15-516]**

Office of Engineering and Technology and Wireless Telecommunications Bureau Seeks Information on Current Trends in LTE-U and LAA Technology

**AGENCY:** Federal Communications Commission.

**ACTION:** Notice.

**SUMMARY:** In this document, the Office of Engineering and Technology (OET) and Wireless Telecommunications Bureau (WTB) seek information on technologies and techniques they will implement to share spectrum with existing unlicensed operations and technologies such as Wi-Fi that are widely used by the public. Parties within the wireless industry are developing a version of commercial wireless LTE technology called LTE-Unlicensed (LTE-U) that is intended for operations in certain unlicensed frequency bands. LTE-U could operate in conjunction with licensed commercial wireless services using a technique called Licensed Assisted Access (LAA) whereby a channel in an operator's licensed spectrum is used as the primary channel for devices operating on an unlicensed basis.

**DATES:** Comments must be filed on or before June 11, 2015 and reply comments must be filed on or before June 26, 2015.

**ADDRESSES:** You may submit comments, identified by ET Docket No. 15-105, by any of the following methods:

- Federal Communications Commission's Web Site: <http://fjallfoss.fcc.gov/ecfs2/>. Follow the instructions for submitting comments.
- Mail: Ira Keltz, Office of Engineering and Technology, Room 7-C250, Federal Communications Commission, 445 12<sup>th</sup> Street, SW, Washington, DC 20554 and Chris Helzer, Wireless

Telecommunications Bureau, Room 6-6415, Federal Communications Commission, 445 12<sup>th</sup> Street, SW, Washington, DC 20554.

- People with Disabilities: Contact the FCC to request reasonable accommodations (accessible format documents, sign language interpreters, CART, etc.) by e-mail: [FCC504@fcc.gov](mailto:FCC504@fcc.gov) or phone: 202-418-0530 or TTY: 202-418-0432.

For detailed instructions for submitting comments and additional information on the process, see the SUPPLEMENTARY INFORMATION section of this document.

**FOR FURTHER INFORMATION CONTACT:** Ira Keltz, Office of Engineering and Technology, (202) 418-0616, e-mail [Ira.Keltz@fcc.gov](mailto:Ira.Keltz@fcc.gov), and Chris Helzer, (202) 418-2791, e-mail [Chris.Helzer@fcc.gov](mailto:Chris.Helzer@fcc.gov) and TTY (202) 418-2989.

**SUPPLEMENTARY INFORMATION:** This is a summary of the Commission's document, ET Docket No. 15-105, DA 15-516, released May 5, 2015. The full text of this document is available for inspection and copying during normal business hours in the FCC Reference Center (Room CY-A257), 445 12<sup>th</sup> Street, SW., Washington, DC 20554. The complete text of this document also may be purchased from the Commission's copy contractor, Best Copy and Printing, Inc., 445 12<sup>th</sup> Street, SW, Room, CY-B402, Washington, DC 20554. The full text may also be downloaded at: [www.fcc.gov](http://www.fcc.gov).

Pursuant to §§ 1.415 and 1.419 of the Commission's rules, 47 CFR 1.415, 1.419, interested parties may file comments on or before the date indicated on the first page of this document. Comments may be filed using the Commission's Electronic Comment Filing System (ECFS). See Electronic Filing of Documents in Rulemaking Proceedings, 63 FR 24121 (1998).

- Electronic Filers: Comments may be filed electronically using the Internet by accessing the ECFS: <http://fjallfoss.fcc.gov/ecfs2/>.
- Paper Filers: Parties who choose to file by paper must file an original and one copy of each filing. If more than one docket or rulemaking number appears in the caption of this proceeding, filers must submit two additional copies for each additional docket or rulemaking number.

- Filings can be sent by hand or messenger delivery, by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail. All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission.
- All hand-delivered or messenger-delivered paper filings for the Commission's Secretary must be delivered to FCC Headquarters at 445 12th St., SW, Room TW-A325, Washington, DC 20554. The filing hours are 8:00 a.m. to 7:00 p.m. All hand deliveries must be held together with rubber bands or fasteners. Any envelopes and boxes must be disposed of before entering the building.
- Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9300 East Hampton Drive, Capitol Heights, MD 20743.
- U.S. Postal Service first-class, Express, and Priority mail must be addressed to 445 12th Street, SW, Washington DC 20554.

People with Disabilities: To request materials in accessible formats for people with disabilities (braille, large print, electronic files, audio format), send an e-mail to [fcc504@fcc.gov](mailto:fcc504@fcc.gov) or call the Consumer & Governmental Affairs Bureau at 202-418-0530 (voice), 202-418-0432 (tty).

Comments and reply comments will be available for public inspection during regular business hours in the FCC Reference Center, Federal Communications Commission, 445 12th Street, S.W., CY-A257, Washington, D.C., 20554. These documents will also be available via ECFS.

### **Synopsis of Public Notice**

1. Parties within the wireless industry are developing a version of commercial wireless LTE technology called LTE-Unlicensed (LTE-U) that is intended for operations in certain unlicensed frequency bands. LTE-U could operate in conjunction with licensed commercial wireless services using a technique called Licensed Assisted Access (LAA) whereby a channel in an operator's licensed spectrum is used as the primary channel for devices operating on an unlicensed basis. By this public notice, the Office of Engineering and Technology and the Wireless Telecommunications Bureau seek information on

these technologies and the techniques they will implement to share spectrum with existing unlicensed operations and technologies such as Wi-Fi that are widely used by the public.

2. A number of organizations have approached the Commission about the development of LTE-U and LAA in the context of the 3.5 GHz and 5 GHz proceedings, which would make spectrum available for general access and unlicensed use, respectively.<sup>1</sup> Some have expressed concern that LTE-U and LAA operations may have a detrimental impact on existing and future use of unlicensed or shared spectrum. Others have asserted that LTE-U and LAA are more efficient than other currently available unlicensed technologies, that LTE-U and LAA include features to share the spectrum fairly with no detrimental impact on existing users of the spectrum, and that consumers will ultimately benefit from increased access to spectrum. We observe that the impact of LTE-U and LAA on unlicensed operations and technologies such as Wi-Fi would be quite different in each band — the 3.5 GHz band is generally newly available spectrum while the 5 GHz bands are already heavily used by Wi-Fi and other unlicensed devices.

3. The 3rd Generation Partnership Project (3GPP), which develops standards for commercial wireless technologies, is developing the LTE-U and LAA standards. The Institute of Electrical and Electronics Engineers Working Group 802.11 (IEEE 802.11) develops standards for wireless local area networks such as Wi-Fi and other unlicensed technologies. Although many parties participate in both standards bodies, the organizations have a limited historical working relationship given their different

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<sup>1</sup> See Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band, GN Docket No. 12-354, Report and Order and Second Further Notice of Proposed Rulemaking, adopted April 17, 2015, FCC 15-47. See also Revision of Part 15 of the Commission's Rules to Permit Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band, ET Docket No. 13-49, First Report and Order, released April 1, 2014, see 29 FCC Rcd 4127 (2014).

backgrounds and scopes. We are aware that some companies have formed the LTE-U Forum,<sup>2</sup> which is considering deployment of LTE-U/LAA using a “pre-standard” version of LTE-U/LAA.

4. The Commission has historically adopted rules that are technologically neutral and remains committed to this policy. With this principle in mind, we are opening this docket to provide an opportunity for interested parties to enable a fully participatory and transparent discussion about LTE-U and LAA technologies and how they will coexist with other technologies, including Wi-Fi. We specifically seek information on the following topics:

- What different variations of LTE in unlicensed spectrum (e.g., LTE-U, LAA) are under active development or on a roadmap for future development? How do they relate to one another in terms of technology, potential use, and timing of availability?
- What is the current state of development of the LTE-U and LAA standards and what is the anticipated schedule for completion of the LTE-U and LAA standards?
- What is the status of coordination between 3GPP and the IEEE 802.11 on LTE-U and LAA, and what is the process for coming to agreement on appropriate sharing characteristics to ensure co-existence with the IEEE 802.11 family of standards?
- What are the anticipated technical characteristics (*e.g.* bandwidth(s), listen-before-talk, transmission durations, etc.) of LTE-U and LAA?
- What tests or analyses have been performed to understand the impact of LTE-U and LAA on the existing commercial wireless and unlicensed ecosystems?
- Precisely how will LAA integrate licensed and unlicensed carriers, particularly with regard to controlling access to spectrum?

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<sup>2</sup> The LTE-U Forum, which was formed in 2014, includes Verizon, Alcatel-Lucent, Ericsson, Qualcomm Technologies, and Samsung. The Forum is developing technical specifications for LTE-U to demonstrate coexistence with Wi-Fi devices in the 5 GHz bands.

- To what extent is a standalone form of LTE-U being developed, that is, a form that can operate without a licensed primary channel?
- Are existing devices capable of software upgrades to implement LTE-U and LAA?
- What frequency bands are envisioned for deployment of LTE-U and LAA?
- What plans do carriers and manufacturers have for pre-standard deployment of LTE-U and LAA equipment including possible upgrades to 3GPP-based LTE-U or LAA and how would the above questions (particularly with respect to coexistence issues) be addressed relative to pre-standard versions of LTE-U and LAA?

5. In addition to information in response to these questions, we encourage parties to submit whatever additional information they feel is relevant to this matter.

6. This public notice is being issued pursuant to §§ 0.31 and 0.131 of the Commission's rules by the Office of Engineering and Technology and the Wireless Telecommunications Bureau.<sup>3</sup>

7. For further information contact Ira Keltz in the Office of Engineering and Technology, [Ira.Keltz@fcc.gov](mailto:Ira.Keltz@fcc.gov), 202 418 0616 or Chris Helzer, in the Wireless Telecommunications Bureau, [chris.helzer@fcc.gov](mailto:chris.helzer@fcc.gov), 202-418-2791.

8. For more news and information about the Federal Communications Commission, please visit: [www.fcc.gov](http://www.fcc.gov)

FEDERAL COMMUNICATIONS COMMISSION.

Julius P. Knapp,  
Chief,  
Office of Engineering and Technology.  
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<sup>3</sup> 47 CFR 0.31, 0.131.